REMARKS

Applicants have carefully studied the outstanding Office Action and reviewed the cited art. The present amendment is intended to place the application in condition for allowance and is believed to overcome all of the objections and rejections made by the Examiner. Favorable reconsideration and allowance of the application are respectfully requested.

Applicants have amended claims **1**, **3** – **8**, **10** – **14**, **16** – **18**, **21**, **23** – **27**, **29** – **32**, **34** – **36**, **38** – **41**, **43** – **53**, **55** – **60**, **62** – **66**, **68** – **70**, **75** and **77** - **80** to more properly claim the present invention. No new matter has been added. Claims **1**, **3** – **14**, **16** – **27**, **29** – **36**, **38** - **53**, **55** – **66** and **68** - **80** are presented for examination.

In Paragraph 3 of the Office Action, claims **1**, **3** – **14**, **16** – **27**, **29** – **36**, **38** - **53**, **55** – **66** and **68** - **80** have been rejected under 35 U.S.C. §103(a) as being unpatentable over Mast, U.S. Patent No. 5,881,287 ("Mast") in view of Dwin et al., U.S. Patent No. 5,986,676 ("Dwin").

Distinctions Between Pending Claims and U.S. Patent No. 5,881,287 to Mast in view of U.S. Patent No. 5,986,676 to Dwin

The pending application is generally directed copy protection of image data that is rendered on a display screen. As examples, the image data may include portions such as logos, pictures, and photos that are proprietary, and portions such as background and text that are not proprietary. The image data rendered on the display screen may be first loaded into a video RAM. Even if the image data is protected by encryption while stored in a computer file and transmitted,

the image data is decrypted and loaded into the video RAM to be rendered, which then makes such data vulnerable to unauthorized copying. Specifically, image data residing in the video RAM can easily be copied by a PrntScrn operation, or by another such operation that captures data directly from the video RAM.

The present invention intervenes with video capture operations and modifies captured data so that proprietary image data is replaced with substitute image data, before the captured data reaches it destination. The present invention distinguishes the proprietary portions of the image data from the non-proprietary portions. Specifically, the present invention modifies image pixel color data, so that proprietary portions of the image data in the video RAM can be identified directly from the pixel color values of the image themselves.

Mast also concerns prevention of copying images from the video RAM, but Mast uses a different data protection technology. Unlike the present invention, Mast overcomes the vulnerability of being able to copy proprietary image data from the video RAM, by (i) injecting hooks into operating system graphics display functions, (ii) identifying portions of the image data that contain proprietary image data, and (iii) blocking the identified portions from being transferred to a destination memory. (Mast / col. 1, line 62 – col. 2, line 2; col. 3, lines 38 – 49; col. 8, lines 18 – 23)

In performing (ii), Mast identifies proprietary portions of the image data by using callback functions to software applications. The software applications send information describing one or more protected pixel regions, which are accumulated into one combined protected region. (Mast / col. 9, line 31 – col. 10, line 53; **FIG. 6**; claims **3**, **4**, **12**, **13**, **28**, **29**, **37**, **38**, **53** and **54**) As such, it is clear that Mast is not able to

identify proprietary image data from pixel color values of the image data. Instead, Mast receives this information from responses to callback functions.

Unlike Mast, which involves preventing capture of proprietary image data by hooking calls to Windows API functions, the present invention operates directly on data being transferred in and out of the video RAM (present specification / element **405** of **FIG. 4**), without patching Windows API functions.

As a result, the technology described by Mast has certain vulnerabilities that are overcome by the present invention. Specifically, as described at pages 11 and 12 of the original specification, the protection technology of Mast can be circumvented by (i) circumventing the Windows API functions, for example, using DirectDraw graphics methods, remote access programs and frame grabbers; or (ii) disabling patched API functions – for example, by intercepting the Windows API SetWindowsHookEx function, or by turning off message loops. The present invention overcomes theses vulnerabilities by (i) marking pixel color data that is transferred into the video RAM by subtly modifying the data (original specification / element **550** of **FIG. 5**), and (ii) modifying marked pixel color data that is transferred out of the video RAM (original specification / element **570** of **FIG. 5**).

Dwin describes a device for protecting pixel locations on a display screen containing graphics data, from being overlaid with video that is being displayed via a frame buffer (Dwin / col. 2, lines 1 – 9). A sample application is a full-screen television program being displayed on a PC, with an overlaid graphics clock that is updated once per minute. Even though the video information is being refreshed at a rapid rate, the protected clock information is not overwritten (Dwin / col. 2, lines 30 –

32; col. 9, lines 38 - 54). Dwin describes a memory (Dwin / element **18** of **FIG. 1**) that stores a frame buffer section and a lock buffer section, where the frame buffer section includes a full screen of data to be displayed, and the lock buffer section stores lock data which protects selected areas in the frame buffer section (Dwin / col. 3, lines 38 – 46; col. 7, lines 7 – 17; **FIG. 3**).

Dwin does not describe modifying least significant bits of pixel color data in a video frame buffer. Instead, as explained above, Dwin uses an auxiliary frame buffer, referred to in **FIG. 3** of Dwin as a lock buffer, for storing a binary bitmap that serves to control a WRITE or NO-WRITE signal.

In the Examiner's Response to Applicants' Arguments on pages 2 and 3 of the Office Action, and in his rejection of the independent claims on pages 4 – 22 of the Office Action, the Examiner bases his rejection on the fact that the lock buffer of Dwin stores pixel color data. However, the description of Dwin indicates that the lock buffer stores protection bits, and not pixel color data. Specifically, applicants note that:

- at col. 2, lines 20 – 28, Dwin recites "*The processor generates lock data based upon the relative position of video information and the information to be protected in the display buffer section and stores the lock data in the lock buffer section of the display buffer. A controller, preferably hardware and/or firmware, reads the lock data and generates WRITE and NO-WRITE signals, therefrom. A memory sequencer responsive to the WRITE and NO-WRITE signals allows information to be written or not written in the display buffer section.*"

- at col. 7, lines 48 – 59, Dwin recites "*As a result, the graphic icon protection data is maintained in the lock buffer ... Once the lock data is placed in the lock buffer, subsequently writing into the frame buffer is controlled by the contents of the lock buffer. In particular a controller ... reads the protection data in the lock buffer section and generates the Write/No-Write control signal which is used by the memory sequencer to write data in the frame buffer section.*"
- At col. 8, lines 52 - 61, Dwin recites "*... the uppermost or left-most screen pixel is protected by the least significant bit of the data word at the address pointed to by the first address of the lock buffer ... the lock protect bit which protects the leftmost pixels of the video window can be positioned anywhere within the memory data word.*"
- At col. 10, lines 47 – 49, Dwin recites "*... said lock-in protection means accessing the lock buffer to read lock data and generating therefrom Write or Not-Write signals ...*"

In order to further clarify the distinction between the present claimed invention and the prior art, applicants have amended the independent claims to include the limitation of distinguishing between portions of image data that are proprietary and portions of image data that are not proprietary, based on the least significant bits of the image data. Indeed, both Mast and Dwin require auxiliary data in order to distinguish between portions of image data. Specifically, Mast distinguishes between portions of image data based on auxiliary information received back from callback functions to software applications, and Dwin distinguishes between portions of image data based on auxiliary lock data. The present invention, however, does not

require auxiliary data in order to distinguish between portions of image data.

The rejections of claims **1**, **3** - **14**, **16** - **27**, **29** - **36**, **38** - **53**, **55** - **66** and **68** - **80** in Paragraph 3 of the Office Action will now be dealt with specifically.

As to amended independent method claim **1**, applicant respectfully submits that the limitation in claim **1** of

"... *distinguishing between the portions of the image data in the video RAM that are proprietary data and the portions of the image data in the video RAM that are non-proprietary data, based on the least significant bits of the image data*"

is neither shown nor suggested in Mast or Dwin, taken individually or in combination.

Because claims **3** - **13** depend from claim **1** and include additional features, applicant respectfully submits that claims **3** - **13** are not anticipated or rendered obvious by Mast, Dwin, or a combination of Mast and Dwin.

Accordingly claims **1** and **3** - **13** are deemed to be allowable.

As to amended independent system claim **14**, applicant respectfully submits that the limitation in claim **14** of

"*a pixel processor distinguishing between the portions of the image data in the video RAM that are proprietary data and the portions of the image data in the video RAM that are non-proprietary data, based on the least significant bits of the image data ...*"

is neither shown nor suggested in Mast or Dwin, taken individually or in combination.

Because claims **16** - **26** depend from claim **14** and include additional features, applicant respectfully submits that claims **16** - **26** are not anticipated or rendered obvious by Mast, Dwin, or a combination of Mast and Dwin.

Accordingly claims **14** and **16** - **26** are deemed to be allowable.

As to amended independent method claim **27**, applicant respectfully submits that the limitation in claim **27** of

"*modifying least significant bits of the image data prior to its being received by the video RAM, thereby generating modified image data within which the portions of the image data in the video RAM that are proprietary data and the portions of the image data in the video RAM that are non-proprietary data can be distinguished from one another, based on the least significant bits of the image data*",

is neither shown nor suggested in Mast or Dwin, taken individually or in combination.

Because claims **29** - **35** depend from claim **27** and include additional features, applicant respectfully submits that claims **29** - **35** are not anticipated or rendered obvious by Mast, Dwin, or a combination of Mast and Dwin.

Accordingly claims **27** and **29** - **35** are deemed to be allowable.

As to amended independent system claim **36**, applicant respectfully submits that the limitation in claim **36** of

"*a digital filter ... generating modified image data within which the portions of the image data in the video RAM that are proprietary data and the portions of the image data in the video RAM that*

are non-proprietary data can be distinguished, based on the least significant bits of the image data",

is neither shown nor suggested in Mast or Dwin, taken individually or in combination.

Because claims **38** - **44** depend from claim **36** and include additional features, applicant respectfully submits that claims **38** - **44** are not anticipated or rendered obvious by Mast, Dwin, or a combination of Mast and Dwin.

Accordingly claims **36** and **38** - **44** are deemed to be allowable.

As to amended independent method claim **45**, applicant respectfully submits that the limitation in claim **45** of

"*distinguishing between the portions of the image data in the video RAM that are proprietary data and the portions of the image data in the video RAM that are non-proprietary data, based on the least significant bits of the image data*"

is neither shown nor suggested in Mast or Dwin, taken individually or in combination.

Because claims **46** - **49** depend from claim **45** and include additional features, applicant respectfully submits that claims **46** - **49** are not anticipated or rendered obvious by Mast, Dwin, or a combination of Mast and Dwin.

Accordingly claims **45** - **49** are deemed to be allowable.

As to amended independent system claim **50**, applicant respectfully submits that the limitation in claim **50** of

"*a pixel processor distinguishing between the portions of the image data in the video RAM that are proprietary data and the*

portions of the image data in the video RAM that are non-proprietary data, based on the least significant bits of the image data ..."

is neither shown nor suggested in Mast or Dwin, taken individually or in combination.

Because claims **51** and **52** depend from claim **50** and include additional features, applicant respectfully submits that claims **51** and **52** are not anticipated or rendered obvious by Mast, Dwin, or a combination of Mast and Dwin.

Accordingly claims **50** - **52** are deemed to be allowable.

As to amended independent method claim **53**, applicant respectfully submits that the limitation in claim **53** of:

"*... recognizing the portions of the image data that are marked as being protected data, from the least significant bits of the image data*"

is neither shown nor suggested in Mast or Dwin, taken individually or in combination.

Because claims **55** - **65** depend from claim **53** and include additional features, applicant respectfully submits that claims **55** - **65** are not anticipated or rendered obvious by Mast, Dwin, or a combination of Mast and Dwin.

Accordingly claims **53** and **55** - **65** are deemed to be allowable.

As to amended independent system claim **66**, applicant respectfully submits that the limitation in claim **66** of

"*a second pixel processor recognizing the portions of the image data that are marked as being protected data, from the least significant bits of the image data ...*"

is neither shown nor suggested in Mast or Dwin, taken individually or in combination.

Because claims **68** - **80** depend from claim **66** and include additional features, applicant respectfully submits that claims **68** - **80** are not anticipated or rendered obvious by Mast, Dwin, or a combination of Mast and Dwin.

Accordingly claims **66** and **68** - **80** are deemed to be allowable.

Support for Amended Claims in Original Specification

Applicants have amended the independent claims to include the limitation of distinguishing between the portions of the image data in the video RAM that are proprietary data and the portions of the image data in the video RAM that are non-proprietary data, based on the least significant bits of the image data. This limitation is supported in the original specification at page 12, line 37 - page 13, line 1; page 13, lines 33 - 35; page 20, lines 8 - 11; page 21, lines 24 - 28; and page 21, line 40 - page 22, line 2.

Applicants have amended the dependent claims to conform to the amended language of the independent claims.

For the foregoing reasons, Applicants respectfully submit that the applicable objections and rejections have been overcome and that the claims are in condition for allowance.

Respectfully submitted,

Dated: February 28, 2007

By: _____

Michael A. Oblon
Attorney for Applicants
Registration No.: 42956
PERKINS COIE LLP
607 Fourteenth Street, NW
Suite 800
Washington, DC 20005-2011